

# CRABS OF THE TIDAL BEACH AT LEE POINT, DARWIN

by

Alan J. Dartnall\* and Darryl L. Grey

NATURAL SCIENCES DEPARTMENT  
NORTHERN TERRITORY MUSEUM

\* Now Zoology Department, University of Tasmania.

The coast of the Northern Territory near Darwin is influenced by a large amplitude semi-diurnal tidal regime. The extreme spring tide variation is over 7.5 metres and less than 1 metre during neaps, with a mean variation of approximately 4 metres.

This rise and fall exposes very large areas of sand flats on the gently sloping beaches near Lee Point and subjects the intertidal areas to alternate flooding and drying, (See Fig. 1). This provides an ideal environment for several species of crabs each of which occupies a zone within the area depending on the degree of moisture required, and their mode of feeding.

The following species occupy zones of the Lee Point sand flats and are listed so that those further down the list are those most dependent on high levels of moisture:-

<i>Coenobita</i> sp.	(Family Paguridae) Hermit Crabs
<i>Ocypode cordimana</i>	} (Family Ocypodidae) Ghost Crabs
<i>Ocypode fabricii</i>	
<i>Ocypode ceratophthalma</i>	
<i>Scopimera inflata</i>	(Family Ocypodidae) Sand Bubbler Crabs
<i>Mictyris longicarpus</i>	(Family Mictyridae) Soldier Crabs

The soldier crab *Mictyris longicarpus* (Latreille) is the species most dependent on high moisture levels of these species and prefers flooded or very damp conditions. During emergence (at day or night) they migrate up and down the beach following the water line, and occupy areas where the level of the water table lies at, or just below the surface.

As the tide recedes, large numbers emerge from the sand in unison and march down to the beach to the wet areas. Here they burrow again with a spiralling action by

digging with the legs on one side of their body and pushing with the legs on the opposite side.

They feed while walking about the moist surface of the sand, scraping the top sand layers into a ball and rolling it about while picking the microscopic food particles off it with their mouthparts. (Cameron 1966). When they move on they leave random aggregations of small spherical pellets.

The sand bubbler crab, *Scopimera inflata* (Milne Edwards) is much less mobile than the soldier crab and occupies a semi-permanent burrow up to 15cm deep in the inter-tidal zone. This area is exposed twice each day and this species feeds when the water table falls somewhat below the bottom of the burrow. When the tide floods the burrow they remain under the surface and only emerge to feed when the water table has fallen sufficiently to leave hard damp sand on the surface. As with the soldier crabs, this species feeds by scraping the surface sand grains together and rolling them into a ball which is passed by the mouthparts where algae, etc. is removed. The ball is then discarded in a rough line radiating from the burrow, the size of the balls being roughly indicative of the size of the individual (See Fig. 2). They feed actively during day and night but dart back into their borrow if disturbed, emerging when the apparent danger is past, (Fielder 1970, Dakin et al 1952).

The next three species of crabs whilst of the same genus, show a slight zonation up the beach depending on moisture requirements. The horn eyed ghost crab, *Ocypode ceratophthalma* (Pallas) (See Fig. 3.) is readily distinguished from the other

two species as adults by the long keratinized stylets on the eyes, a characteristic coloured 'H' on the dorsal surface of the carapace and coarse striae on the stridulating (noise making) organ which grade to form spaced granules. This species is often found at the wet end of burrows in the intertidal zone. Its activity is predominantly nocturnal but occasionally individuals can be disturbed from near burrows during daytime. As with all ghost crabs their colouration is a masterpiece of camouflage and they are very difficult to see while stationary on a sandy beach.

The next ghost crab is *Ocypode fabricii* (Milne Edwards) and this species generally burrows near the strand line at high tide mark. Again it is most active after sunset and emerges to feed on debris along and above the high tide line. The stridulating organ of this species is composed of a ridge of 100 or so very fine striae, (See Fig. 4.) The burrows are generally 50 to 80 cm deep in slightly damp sand, but rarely is the bottom of the burrow wet as with *O. ceratophthalma* although occasionally these may flood at spring high tides, (See Fig. 5).

The most terrestrial of the ghost crabs is *Ocypode cordimana* (Desmaret). This species is slightly smaller than the other two represented here and is distinguished by the absence of a stridulating ridge on the inside of the hand. It forages mainly at night in a zone from the high tide line on the beach up to several hundred metres inland amongst the fringing shoreline trees and grasses. The burrows are generally similar to those of *O. fabricii* but are generally placed higher up the beach near vegetation in damp sand or clay, but never in wet conditions.

The most terrestrial crab resident at Lee Point is the hermit crab, *Coenobita* sp. This species is almost independent of the sea and apart from occasional excursions to the water for moisture and reproduction, spends its time between the dunes (and accompanying vegetation) and the strand line leaving characteristic patterns, (See Fig. 6.). Their ability to remain in dry conditions for extended periods is linked to their adaptations for moisture control including their adopted shell with the cheliped,

and the presence of well developed gills that permit atmospheric oxygen exchange. This is very necessary in view of the fact that this species does not burrow and cannot choose a moist area during the heat of the day as do the *Ocypode* crabs. Feeding activity is generally nocturnal although these crabs are often active on cool wet days.

Figure 7. provides a diagrammatic representation of the zonation of tidal beach crabs at Lee Point. Note that the distribution of *Mictyris* varies with tidal level according to migration and the positions located in the figure correspond to low tide.

The authors wish to acknowledge the inspiration and assistance provided by Dr. Ray George (W.A. Museum) in the preparation of this article.

Key to Darwin species of *Ocypode* (from George and Knott 1965)

1. Palm of large cheliped with stridulating organ .....2  
     Palm of large cheliped without stridulating organ  
         *O. cordimana*
2. Stridulating organ round and/or elongated tubercles in the upper part and transverse ridges in the lower; lower orbital edge with no lateral notch  
     ...*O. ceratophthalma*  
     Stridulating organ composed solely of fine transverse ridges (108 - 141); lower orbital edge with a broad, U-shaped lateral notch.  
         ...*O. fabricii*

#### REFERENCES

- CAMERON, A.M. (1966) Some aspects of the behaviour of the soldier crab *Mictyris longicarpus*. Pac. Sci. 20, 224-34.
- DAKIN, W.J. (1952) "Australian Seashores"
- BENNETT, I. and POPE, E. (Angus and Robertson, Sydney)
- FIELDER, D.R. (1970) Feeding of the sand crab *Scopimera inflata* J. Zool. 160, 35-49.
- GEORGE, R.W. & KNOTT, Mary E. (1965) The *Ocypode* Ghost crabs of Western Australia (Crustacea, Brachyura) J. Roy Soc. W.A. 48 1, 15-21.



FIGURE 1 : Intertidal sand flats at Lee Point, Darwin, during low tide (NOTE: *Scopimera* bubbles).

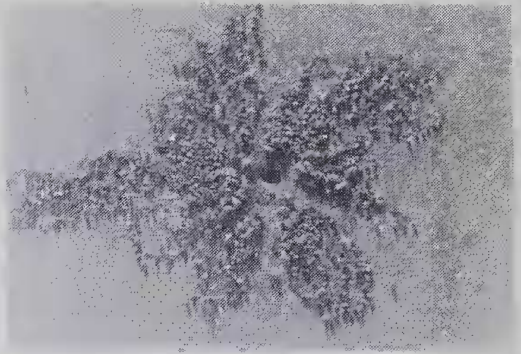


FIGURE 2 : Burrow of *Scopimera inflata* showing characteristic sand 'bubbles'.

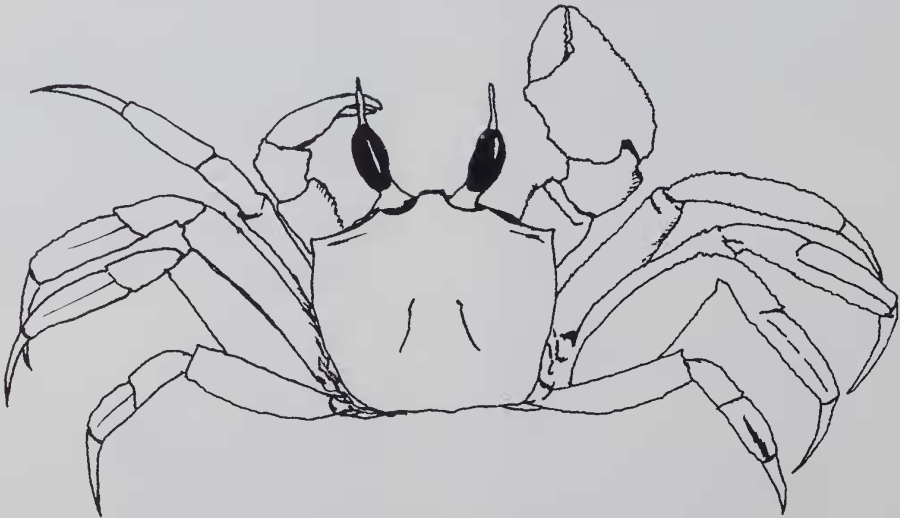


FIGURE 3 : *Ocypode ceratophthalma* male. (after Dakin et al) Scale: actual size.

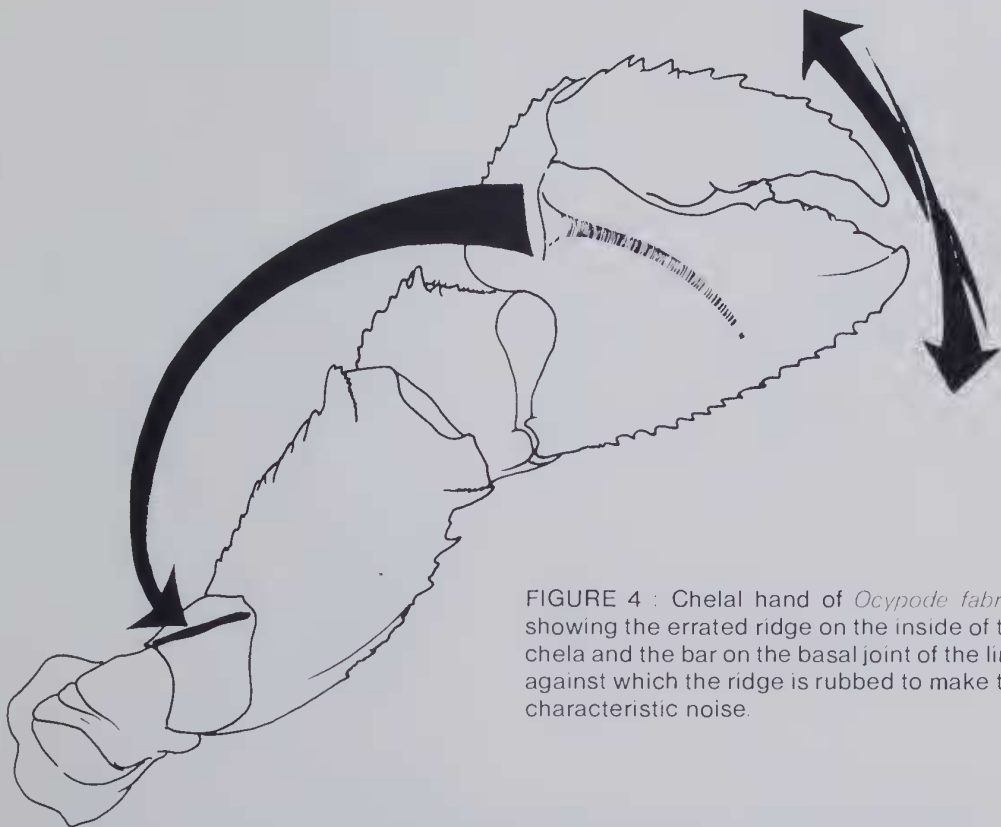


FIGURE 4 : Chelal hand of *Ocypode fabricii* showing the errated ridge on the inside of the chela and the bar on the basal joint of the limb against which the ridge is rubbed to make the characteristic noise.

FIGURE 5 : Burrow of ghost crab - probably *Ocypode fabricii*



FIGURE 6 : The hermit crab *Coenobita sp.* showing characteristic tracks



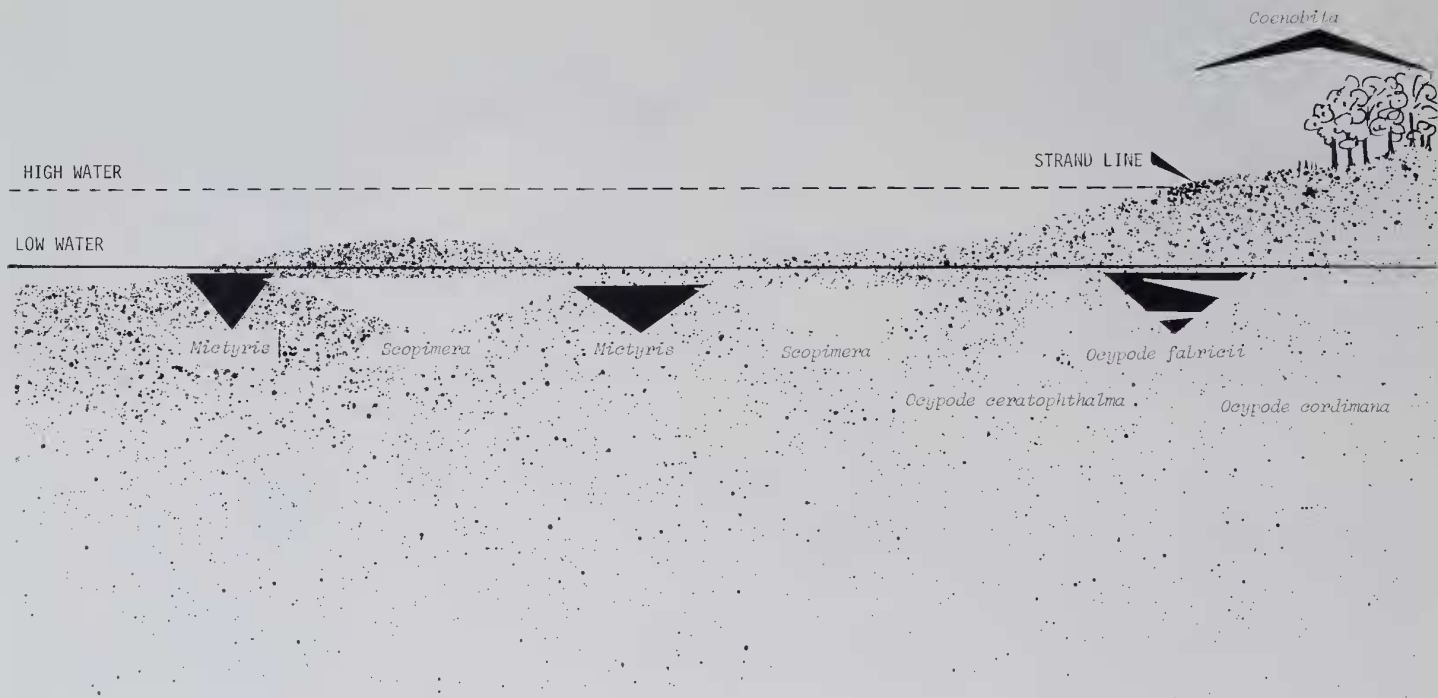


FIGURE 7 : Section of beach at Lee Point, Darwin showing zonation of tidal beach crabs - note vertical scale much expanded.